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Research Article

Distribution of Myeloid Leukemia and Lymphocytic Leukemia in Jamaica 2008

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ABSTRACT

Objective: To determine the distribution of Myeloid Leukemia and Lymphocytic Leukemia in Jamaica 2008.

Methods: The study included all fourteen parishes. Data was obtained from the Jamaica Cancer Registry located in the Pathology Department of the University of the West Indies. Population denominators were obtained from the 2011 census taken by the Statistical Institute of Jamaica. The statistical package which was used to analyze the data was excel.

Results: The highest frequencies of myeloid leukemia in 2008 occurred in the age group 40 years to 44 years and 65 years to 69 years. No further incidence of myeloid leukemia was recorded after 79 years. In Jamaica 2008, the median age at which myeloid leukemia was diagnosed was 47 years. The Crude Incidence Rate (CIR) for myeloid leukemia for both sexes was 0.9, 1.3 for males and 0.5 for females. Hence in Jamaica 2008 myeloid leukemia was predominant in males (male/female ratio, 2.6). The probability of developing myeloid leukemia across all parishes was examined using the Crude Incidence Rate (CIR). The highest probability was someone residing in the parish of St. Thomas (3.2), this was followed by St. Ann (1.7), Kingston and St. Andrew (1.2), St. Catherine (1.0), St. Mary (0.9), Clarendon (0.8), St. Elizabeth (0.7) and Manchester (0.5). The crude incidence rates for the remaining parishes were zero. Kingston and St. Andrew were treated as one because they are very interwoven. In Jamaica 2008 cases of lymphocytic leukemia were sporadic when all age groups were considered. Onset began within the 0 year to 9 years group and after 80 years to 89 years no more cases were diagnosed. The median age at which lymphocytic leukemia was diagnosed was 46 years. When both sexes were considered the crude incidence rate was 0.4. In 2008 in the case of males the CIR was 0.4 and in the case of females the CIR was 0.4 (male/female ratio, 1.0). Hence in 2008 there was no dominance when the genders were compared.The CIR was used to determine in which parish an individual was most at risk to developing lymphocytic leukemia. In descending order an individual would be most at risk in Portland (1.2), St. Catherine (0.8), Kingston and St. Andrew (0.5), Manchester (0.5) and Clarendon (0.4).

Conclusion: In reducing the effects of these cancers, education is of extreme importance regarding familial predisposition as well as exposure to chemical agents such as insecticides, radiation etc. Screening should also be done.

Keywords: Myeloid leukemia; Lymphocytic leukemia; Jamaica cancer registry; Crude incidence rate

INTRODUCTION

Since the inception of the Jamaica Cancer Registry in 1958 the incidence of cancer in Jamaica has been monitored by reports being produced regularly [1]. These reports are based upon the incidence of cancer in males and females in Kingston and St. Andrew which forms the population base of the registry [1-2]. Gibson et al. (2008) determined the Crude Incidence Rate (CIR) for myeloid leukemia for males and females in Kingston and St. Andrew for the period 1998 to 2002 [1]. In the case of males the CIR was determined to be 1.2 and in the case of females it was 1.3. They also determined the CIR for lymphocytic leukemia during the same time period from 1998 to 2002. In the case of males the CIR was determined to be 1.2; however the CIR for females was 0.6. This present study has been undertaken to investigate

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the distribution of myeloid leukemia and lymphocytic leukemia across all fourteen parishes in Jamaica in the year 2008.

METHODOLOGY

Study population

This research project consists of persons from all parishes in Jamaica. A map of Jamaica is shown in Figure 1 [3]. Data was obtained from the Jamaica Cancer Registry located in the Pathology Department of the University of the West Indies. The methodology of the registry has been previously stated [4-5]. Cases are registered from information gleaned from public and private hospitals and general practitioners in Kingston and St. Andrew then verified by pathologists at Jamaica Cancer Registry in accordance with standard techniques of registration [6].

Data extraction

Variables that were obtained from the Jamaica Cancer Registry included cancer code, date of diagnosis, age at diagnosis, permanent residence, parish of birth, diagnosis, gender, smoker, source of case and date of death. The codes used for classification of the various types of cancers were cross-checked using the tenth edition of the International Statistical Classification of Diseases and Related Health Problems (ICD–10) [7]. Population denominators were obtained from the 2011 census taken by the Statistical Institute of Jamaica, Kingston, Jamaica [8].

Statistical analysis

The statistical package which was used to analyze the collected data was Microsoft excel. The Crude Incidence Rate (CIR) was also determined. It was calculated by dividing the total number of cases of cancer diagnosed in a specific population by the size of the population and then multiplying the result by 100000 [1-2].

RESULTS AND DISCUSSION

When Table 1 was examined onset of myeloid leukemia began in the 5 years to 9 years age group in 2008. Two peaks occurred, these were in the 40 years to 44 years age group and the 65 years to 69 years age group. After 79 years no further incidence of myeloid leukemia was recorded in the population. Deschler and Lübbert (2006) stated that Acute Myeloid Leukemias (AMLs) are infrequent however highly malignant neoplasms which are responsible for a large number of cancer-related deaths [9]. They further stated that it continuously shows two peaks in occurrence, in early childhood and later adulthood. Deschler and Lübbert (2006) also declared that AML has a slight male predominance in most countries. They also disclosed that in 2000 to 2003, the age-adjusted incidence rate of AML in the U.S. was 3.7 per 100,000 for both sexes, 4.6 per 100,000 for males and 3.0 per 100,000 for females. In Jamaica 2008 the Crude Incidence Rate (CIR) for myeloid leukemia for both sexes was 0.9, 1.3 for males and 0.5 for females. Hence in Jamaica 2008 myeloid leukemia was predominant in males (male/female ratio, 2.6). The probability of developing myeloid leukemia in the United States was much higher compared to Jamaica. Gibson et al. (2010) only considered cases of myeloid leukemia in Kingston and St. Andrew for the period 2003 to 2007 [2]. They obtained a CIR of 1.7 for males and 1.0 for females. They determined that the probability of developing myeloid leukemia was greater in males than females (male/female ratio, 1.7). AML occurs primarily in the older population with a median age at diagnosis of 68 to 70 years [10-12]. In Jamaica 2008, the median age at which myeloid leukemia was diagnosed was 47 years. Alabdulwahab et al. (2020) reported that in the western region of Saudi Arabia a median age of 42 years when AML was diagnosed [13]. This study also reported higher frequencies of cases among males than females. This closely aligned with what was obtained in Jamaica in 2008. In Table 2 the probability of developing myeloid leukemia across all parishes was examined using the crude incidence rate (CIR). The highest probability was someone residing in the parish of St. Thomas (3.2), this was followed by St. Ann (1.7), Kingston and St. Andrew (1.2), St. Catherine (1.0), St. Mary (0.9), Clarendon (0.8), St. Elizabeth (0.7) and Manchester (0.5). For the remaining parishes the CIR was zero. Kingston and St. Andrew were treated as one because they are so interwoven. The bar chart in Figure 2 shows how the crude incidence rate varies from parish to parish in Jamaica 2008. This differentiation based upon the CIR may have been due to any of the following factors, age, antecedent hematologic disease, genetic disorders, exposure to viruses, radiation, chemical or other occupational hazards as well as previous chemotherapy [14-16].

Table 3 shows that in Jamaica 2008 cases of lymphocytic leukemia were sporadic when all age groups were considered. Onset began within the 0 year to 9 years group and after 80 years to 89 years no more cases were diagnosed. When both sexes were considered the crude incidence rate was 0.4 for lymphocytic leukemia. In 2008 in the case of males the CIR was 0.4 and in the case of females the CIR was 0.4 (male/female ratio, 1.0). Hence in 2008 there was no predominance when both genders were compared. Gibson et al. (2010) determined the CIR for lymphocytic leukemia in Kingston and St. Andrew for the period 2003 to 2007. In the case of females they obtained 0.9 and in the case of males the CIR was 1.0, (male/female ratio, 1.1). Eichhorst et al. (2020) stated that chronic lymphocytic leukemia is the most common leukemia in the western world [17]. This was not the case in Jamaica 2008. Eichhorst et al. (2020) also stated that the median age at diagnosis was 72 years. In Jamaica 2008 the median age was 46 years. Kipps et al. (2017) declared that although chronic lymphocytic leukemia is the most common adult leukemia in western countries, it is however less common in Asia and relatively rare in Japan and Korea [18]. They further stated that it was rare even in Japanese people who have immigrated to western countries. This is indicating a genetic factor predisposing individuals to develop lymphocytic leukemia. Kipps et al. (2017) declared that the risk of developing Chronic Lymphocytic Leukemia (CLL) is about two times higher for men than women and this risk increases with age. In Jamaica 2008 both genders were equally at risk however the risk did not increase with age as observed in Table 3. The CIR was used to determine in which parish an individual was most at risk in developing lymphocytic leukemia. This was illustrated in Table 4. In descending order an individual would be most at risk in Portland (1.2), St. Catherine (0.8), Kingston and St. Andrew (0.5), Manchester (0.5) and Clarendon (0.4). This may be due to genetic factors as well as exposure to chemical agents. Schinasi et al. (2015) stated that evidence suggested that exposure to insecticides might be a risk factor in developing CLL [19].

Figure 1: Map of Jamaica showing all the parishes.

Table 1: Frequency table showing grouped data of persons diagnosed with Myeloid Leukemia in Jamaica 2008.

Age/yr	Frequency		
	Both genders	Male	Female
0-4	0	0	0
5-9	1	1	0
10-14	0	0	0
15-19	1	1	0
20-24	1	0	1
25-29	1	0	1
30-34	1	0	1
35-39	1	1	0
40-44	5	3	2
45-49	2	2	0
50-54	0	0	0
55-59	1	1	0
60-64	3	2	1
65-69	4	3	1
70-74	1	1	0
75-79	2	2	0
80-84	0	0	0
85-89	0	0	0
90-94	0	0	0
95+	0	0	0
TOTAL (N)	24	17	7

Table 2: Comparing the crude incidence rate of myeloid leukemia for all parishes in Jamaica 2008.

Parish	Cancer Cases	Population Size	Crude Incidence Rate
St. Thomas	3	93902	3.2
St. Ann	3	172362	1.7
Kingston and St. Andrew	8	662426	1.2
St. Catherine	5	516218	1
St. Mary	1	113615	0.9
Clarendon	2	245103	0.8
St. Elizabeth	1	150205	0.7
Manchester	1	189797	0.5
Portland	0	81744	0
Westmoreland	0	144103	0
Trelawny	0	75164	0
Hanover	0	69533	0
St. James	0	183811	0

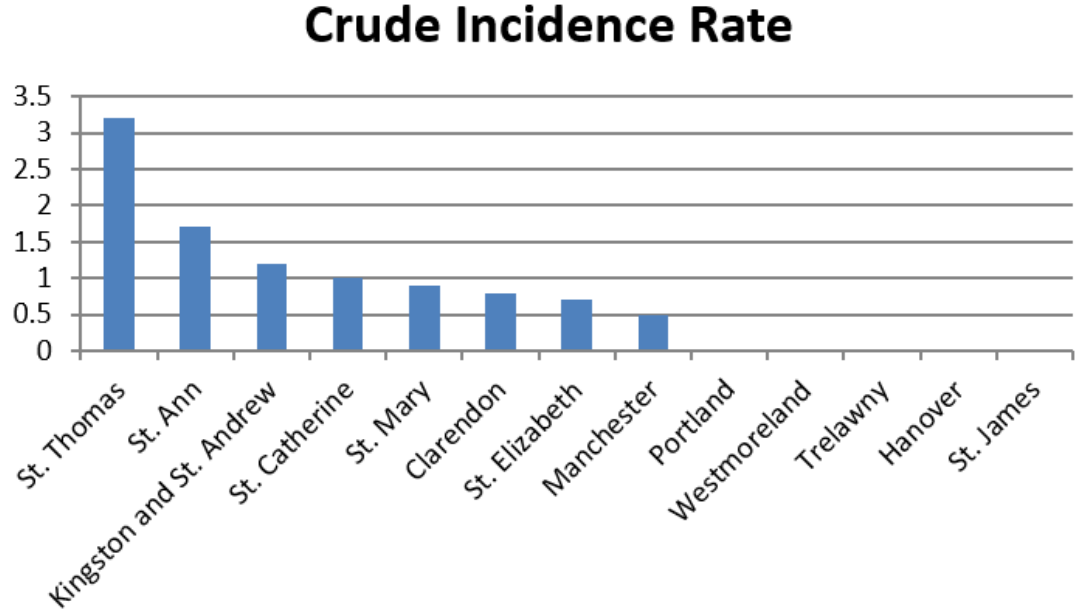

Figure 2: Bar chart comparing the crude incidence rate of Myeloid Leukemia for all parishes in Jamaica 2008.

Table 3: Frequency table showing grouped data of persons diagnosed with Lymphocytic Leukemia in Jamaica 2008.

Age/yr	Frequency		
	Both genders	Male	Female
0-4	1	0	1
5-9	2	1	1
10-14	0	0	0
15-19	0	0	0
20-24	1	1	0
25-29	0	0	0
30-34	0	0	0

35-39	1	0	1
40-44	0	0	0
45-49	0	0	0
50-54	1	0	1
55-59	2	1	1
60-64	0	0	0
65-69	0	0	0
70-74	0	0	0
75-79	0	0	0
80-84	1	1	0
85-89	1	1	0
90-94	0	0	0
95+	0	0	0
TOTAL (N)	10	5	5

Table 4: Comparing the crude incidence rate of lymphocytic leukemia for all parishes in Jamaica 2008.

Parish	Cancer Cases	Population Size	Crude Incidence Rate
Portland	1	817444	1.2
St. Catherine	4	516218	0.8
Kingston and St. Andrew	3	662426	0.5
Manchester	1	189797	0.5
Clarendon	1	245103	0.4
St. Elizabeth	0	150205	0
St. Ann	0	172362	0
Trelawny	0	75164	0
St. Thomas	0	93902	0
Westmoreland	0	144103	0
St. James	0	183811	0
St. Mary	0	113615	0
Hanover	0	69533	0

CONCLUSION

In order to reduce the prevalence of myeloid leukemia and lymphocytic leukemia within any population it is important that appropriate education of the public occurs as well as screening. Education is extremely important since in both forms of leukemia genetics is an important risk factor. The public should also be informed regarding the use of certain insecticides as well as other important risk factors.

LIMITATIONS

In 2008 and earlier there were two major cancer treatment centres in Jamaica for the public. These were Kingston Public hospital in Kingston and Cornwall Regional hospital in St. James. The machines they had at that time were cobalt machines. Hence many cases would be referred to Kingston Public hospital from other parishes or to Cornwall Regional hospital. This would depend on the proximity and the accessibility, meaning the length of the waiting list. Staff at the Jamaica Cancer Registry only gets data from hospitals and private sources in Kingston and St. Andrew Jamaica. Hence some patients from the western end of the island such as the parishes of St. James, Westmoreland, Trelawny and Hanover would not be recorded based upon the present practise. Hence these would contribute to errors in the data from parishes in those regions of the island. In Kingston at that period there was the Radiation Oncology Centre of Jamaica which was established in 2001. This is a private centre for the treatment of cancer. Hence the limitation here would be your socioeconomic status. There would also be persons who would seek alternative ways to treat their cancer.

DISCLOSURES

Data availability statement

The data used were not available online and permission granted is in the document attached.

Conflicts of interest

None

Funding

None

Ethical approval

Ethical approval was not requested because data was treated anonymously.

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REFERENCES

1. Gibson TN, Blake G, Hanchard B, Waugh N, McNaughton D. Age-specific incidence of cancer in Kingston and St Andrew, Jamaica, 1998–2002. West Indian Med J. 2008;57(2):81-89.
2. Gibson TN, Hanchard B, Waugh N, McNaughton D. Age–Specific incidence of cancer in Kingston and St. Andrew, Jamaica, 2003–2007. West Indian Med J. 2010; 59(5): 456–464.
3. Map of jamaica parishes and capitals.2023.
4. Bras G. Cancer incidence in Jamaica, Kingston and St Andrew 1958–1963. Cancer incidence in five continents. 1966;1:84-89.
5. Brooks SE, Wolff C. Age-specific incidence of cancer in Kingston and St. Andrew, Jamaica. Part I: 1978-1982. The West Indian Med J. 1991;40(3):127-128.
6. Skeet RG. Quality and quality control. In: Jensen OM, Parkin DM, MacLennon R, Muir CS, Skeet RG, eds. Cancer Registration: Principles and methods (IARC Scientific Publications no. 95). Lyon. 1991;101-107.
7. World Health Organization. International statistical classification of diseases and related health problems: alphabetical index. 2004.
8. Population by five year age groups by sex, by parish. 2011.
9. Deschler B, Lübbert M. Acute Myeloid Leukemia: Epidemiology and Etiology. Cancer. 2006;107(9):2099-2107.
10. Short NJ, Rytting ME, Cortes JE. Acute myeloid leukaemia. The Lancet. 2018;392(10147):593-606.
11. Dong Y, Shi O, Zeng Q, Lu X, Wang W, Li Y, et al. Leukemia incidence trends at the global, regional, and national level between 1990 and 2017. Exp Hematol Oncol. 2020;9:1-11.
12. Heuser M, Ofran Y, Boissel N, Mauri SB, Craddock C, Janssen J, et al. Acute myeloid leukaemia in adult patients: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Ann Oncol. 2020;31(6):697-712.
13. Alabdulwahab AS, Elsayed HG, Sherisher MA, Zeeneldin A, Elbjeirami WM. AML in Saudi Arabia: analysis according to the European LeukaemiaNet 2017 cytogenetic classification. Clin Lymphoma Myeloma Leuk. 2020;20(5):e212-220.
14. Aquino VM. (2002). Acute myelogenous leukemia. Curr Probl Pediatr Adolesc Health Care. 2002;32(2): 50-58.
15. Pogoda JM, Preston-Martin S, Nichols PW, Ross RK. Smoking and risk of acute myeloid leukemia: Results from a Los Angeles County case-control study. Am J Epidemiol. 2002;155:546-553.
16. Pui CH. Childhood leukemias. N Engl J Med. 1999;332:1618-1630.
17. Eichhorst B, Robak T, Montserrat E, Ghia P, Niemann CU, Kater AP, et al. Chronic lymphocytic leukaemia: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Ann Oncol. 2020;32(1): 23-33.
18. Kipps TJ, Stevenson FK, Wu CJ, Croce CM, Packham G, Wierda WG, etal. Chronic lymphocytic leukaemia. Nat Rev Dis Primers.2017;3:16096.
19. Schinasi LH, de Roos AJ, Ray RM, Edlefsen KL, Parks CG, Howard BV, et al. Insecticide exposure and farm history in relation to risk of lymphomas and leukemias in the Women's Health Initiative observational study cohort. Ann Epidemiol. 2015;25(11):803-810.